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THE WESTENHAVER MOUND.

Certain Mounds and Village Sites in Ohio

VOL. 2. PART 4

Exploration of the Westenhaver Mound

by

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Columbus, Ohio

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EXPLORATIONS OF THE WESTENHAVER MOUND.

BY WILLIAM C. MILLS.

The Westenhaver Mound is located in Wayne township, Pickaway county, Ohio, on the west bank of the Scioto river. The land on which the mound is situated is owned by Mr. and Mrs. George E. Roth, and lies about six miles southwest of Circleville and three miles north of the village of Yellow Bud.

The site of the earthwork is a level plateau, comprising the first bottom of the Scioto river, which at this point is elevated almost fifty feet above low-water mark of that stream. The river, which is distant only a few hundred feet from the site of the mound, encroaches so closely upon the terrace forming the first level above its bed, that barely enough room existed for the construction of the Ohio canal, the natural waterway being separated from the artificial one only by a narrow towpath.

The land comprising this first bottom is typical of this rich section of the Scioto valley, being principally a clayey loam, from two feet to ten feet deep, overlying deposits of gravel.

HISTORICAL DATA CONCERNING THE MOUND.

The Westenhaver Mound takes its name from a former owner of the farm, who more than a quarter of a century ago made a partial examination of it. At that time, the idea prevailed generally that burials within mounds were to be found at the center on the base line. Consequently workmen sunk a shaft with the idea of exposing that portion of the base, and in this instance their expectations were justified, as perhaps the most interesting burial in the structure was uncovered.

This burial, the principal one of the mound, occupied a specially constructed grave, and was remarkable for the great amount of woven fabric accompanying it. Fortunately, parts of the skeleton remained in the grave, which we were able to examine with some satisfaction. The interment is more fully described under the head of burials contained in the mound.

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The results of Mr. Westenhaver's examination were published in a local newspaper, but in the absence of the published account or of any person having exact knowledge in the matter, it is not known definitely what, besides the cloth, was removed from the grave. It is believed however, that ornaments or implements must have accompanied so important a burial, and this belief is strengthened by the finding of a copper bracelet in the earth near the top of the mound which evidently had been thrown out of the shaft at the time of Mr. Westenhaver's examination. This bracelet is typical of the culture, round in cross-section, and about two and three-fourths inches across. Although copper is to be expected in mounds of this culture, the bracelet is the only specimen of the metal found.

The fabric found with this burial perhaps comprised the largest and best preserved exhibit of cloth ever taken from an Ohio mound. The entire lot later was secured from Mr. Westenhaver by a collector residing in Dayton, and upon his death was sold, partly to Dayton collectors and partly at auction by a Boston firm. Through the generosity of Mr. McMurray, of Dayton, a fine specimen of the cloth is now in the Museum of the Ohio State Archaeological and Historical Society.

THE MOUND, EXTERNALLY.

At the time of the present examination of the Westenhaver Mound, the site was a cultivated field, and although farmed for many years, the mound itself had never been plowed nor cleared of trees, owing to its abrupt contour. On the west and south sides, it was covered with trees and grass, while on the east and north, a tangle of trees, vines and undergrowth completely covered the surface. The trees covering the structure were seventeen in number, consisting of white oak, red oak, black walnut, and hickory, and ranged from a few inches to one of two feet in diameter. Their removal necessitated considerable labor, and the roots, penetrating every portion of the mound, were a source of hindrance throughout its examination.

SURVEY OF THE MOUND.

On June 18, 1915, preliminary to the examination of the earthwork, Mr. C. A. Campbell began a survey for a topographical map, shown as Fig. 1. The maximum height of the mound, as shown by this survey, is 16 feet, while its base, which is elliptical in outline, is 110 feet along its north and south axis, 90 feet along the east and west axis, and its perimeter approximately 320 feet. The solid content of the structure was found to be about 1900 cubic yards.

After completing the field work necessary for compiling the topographic map, Mr. Campbell established secondary traverse points on and adjacent to the mound, and from these by the aid of the instrument located the burials as they were uncovered. The map, prepared from his notes, is shown as Fig. 2, and illustrates a cross-section of the mound.

THE WORK OF EXCAVATION.

The actual examination of the mound was begun June 21, 1915 and required the greater part of three weeks, and the labor of ten men to complete it. Excavation was begun at the southeast side at the base line, a cut being extended fifty feet to the south and then an equal distance to the north.

It was found that the mound was constructed mainly from the surface soil immediately surrounding the site, as shown by the topographical map. Within the body of the mound were occasional pockets of gravel, while near the base piles of clay and gravel indicated a sub-base burial.

The examination of the mound was greatly retarded by frequent rains which filled the cuts, necessitating much time and labor to place them in condition to proceed with the work. Again, the mound from top to base was literally honeycombed with burrows of the groundhog. These burrows carried surface water into the interior of the mound, resulting in damage and deterioration to burials, and as the season was extremely rainy, many places within the structure were in such condition that critical examination was very difficult.

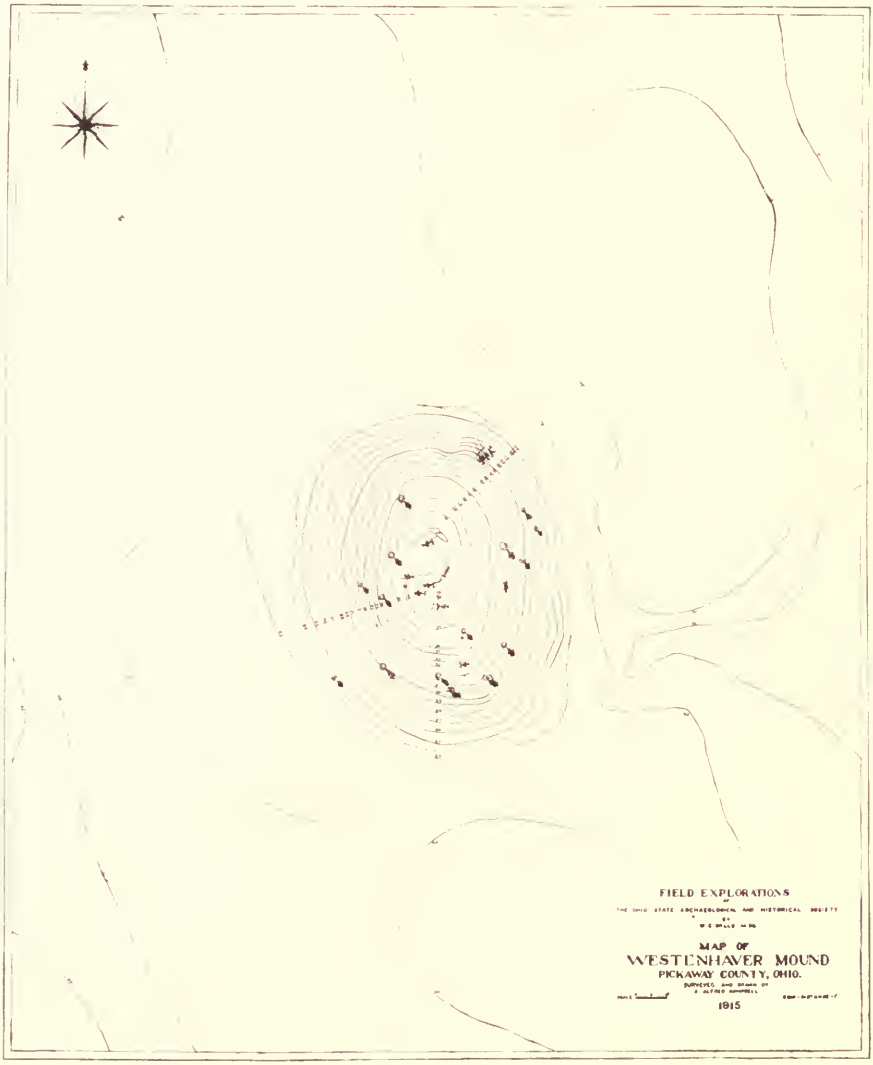

Fig. 1. Map of the Westenhaver Mound.

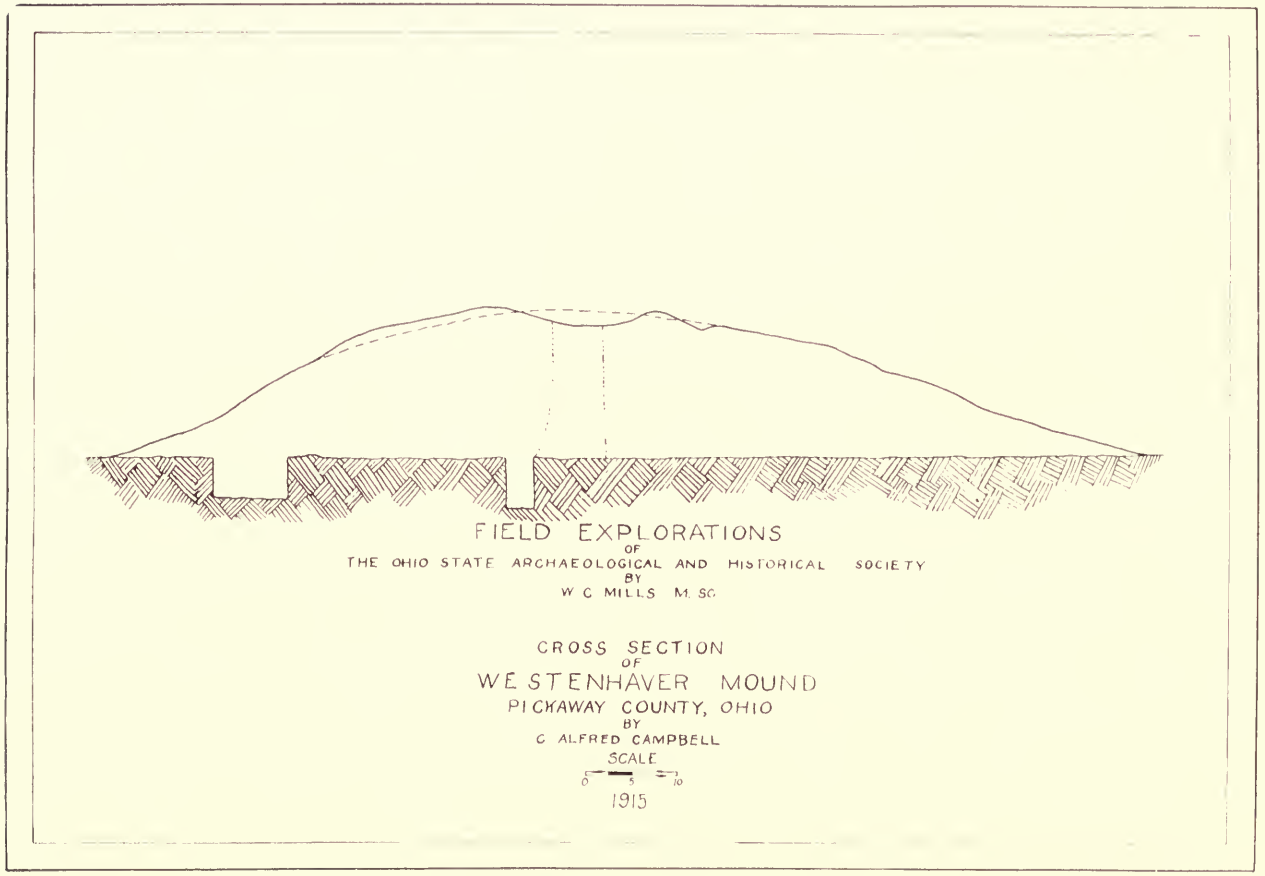

Fig. 2. Cross-section of the Westenhaver Mound.

FEATURES OF INTEREST.

A number of interesting features characterized the examination of the Westenhaver Mound, several of them never before having been noted in the Ohio mounds. Chief of these features were the pathological flattening and mineralizing, accompanied by partial mummification of the bones and flesh of two burials; the very bold and distinct marks of the digging stick in the tough clay walls of the principal sub-base grave; and the use of logs and brush to supplement earth, in building up the body of the mound.

This latter condition was observed principally at the south side of the mound, where the imprints of trees varying in diameter from five inches to two feet showed that the site at that point had not even been cleared in preparation for the erection of the mound. Other mounds examined have shown the use of logs and brush in leveling the site and in filling in low places in preparation thereof, later being covered with earth to produce a uniform base, but in this instance, the south side of the site was naturally highest, and the logs had been used in lieu of earth in the construction of the work.

A total of fifteen burials were located in the mound. Three of these were on the base line, four below the base, and eight were scattered promiscuously through the body of the mound. The original burial probably was one found near the center of the mound, in a dug grave four feet below the base line. Practically all the artifacts found accompanied this burial. The only burial placed directly on the base line having a well prepared grave, was that uncovered by Mr. Westenhaver near the center of the structure. The burials scattered throughout the mound showed many interesting examples of reburial, individual bones often being missing, and those present occupying positions foreign to the skeleton as a whole. Aside from these secondary burials, the usual position of the skeletons was at full length, upon the back.

DESCRIPTION OF THE BURIALS.

The first burials found were near the north side of the mound, and are shown in Fig. 3. In an unusually large grave,

FIG. 3. Burial in the Westenhaver Mound showing three individuals; one child and two adults.

seven feet six inches long, five feet wide, and extending four feet below the base line, had been buried three bodies, two adult males, and a child, from seven to ten years old.

The adults had been placed in the grave at full length, arms extended close to the body, while the child lay in a flexed position, on the right side. The heads of all three were toward the east. No implements or ornaments were with the bodies, but within the grave above them were found four well-wrought flint arrowpoints, which apparently, together with their shafts, had been placed there intentionally at the time of burial.

Burial No. 4, the remains of an adolescent, was found on the east side of the mound, about ten feet below the top. The skeleton had been disarranged by groundhogs, parts of it being found some distance away within their burrows. The skull however, was fairly preserved, and was removed intact.

Burial No. 5, corresponds to the one exhumed by Mr. Westenhaver previously referred to. This burial was the most interesting of the entire mound, owing to the great amount of woven fabric accompanying it, and to the fact that it occupied a well prepared sepulchre made of logs. Sufficient of the burial remained undisturbed to afford a fairly definite idea of its original condition. The north end of the grave had not been destroyed, and the bones of the feet and a quantity of the charred cloth accompanying the body were undisturbed. The cloth is shown in Figs. 4 and 5.

Also a number of ornaments made of bone and teeth were left in the grave. The most interesting of these was an ornament made of the end of the lower jaw of the black bear which includes the incisors and the canines of a young animal as shown by the hollow canines. Also a number of cut incisors of the beaver which had the appearance of forming a part of a necklace. The specimens are shown in Fig. 6.

It developed in examination that Mr. Westenhaver's shaft had pierced the grave at the south end, or at the head, and that the shaft had been enlarged at the bottom to permit of the removal of the skeleton and its accompanying objects. The deduction therefore is that the burial was similar to many others characteristic of the early Hopewell culture; that it had been

Fig. 1. Cloth from the great central grave examined by Mr. Westenhaver.

Fig. 5. Cloth from the great central grave examined by Mr. Westenhaver.

placed fully extended in the grave, with the head to the south; that the body had been wrapped in cloth, and that a covering of grass and twigs had then been placed upon the body and this inflammable material then burned.

This fire ceremony, frequently observed, accounts for the charring and consequent preserving of the fabric placed with bodies in the Hopewell culture.

FIG. 6. End of the lower jaw of bear cut into an ornament; also cut beaver incisors from the great central grave examined by Mr. Westenhaver.

While positive and conclusive evidence of the performance of such a ceremony in this instance may be lacking, the scant remains within the grave make it very probable that the same conditions found at both the Harness Mound* and the Seip Mound* prevailed here also. Remains of the charred cloth, twigs and branches showed that a fire had been kindled, and covered with earth while still burning. No evidence of the charring of the logs comprising the sepulchre was to be seen. Taken all together, the evidence points to the first ceremony of kindling the sacred fire over the dead, as the initial step in constructing the mound, or in its consecration, and then of covering this fire while burning, with earth.

Burial No. 6, owing to the flattened condition of the bones and the partially mumified flesh attached to them, is of particular interest. This burial was placed just east of the center of the mound, and about nine feet below its top. The head

*The Harness Mound is located eight miles south of Chillicothe, along the Scioto river. See "Certain Mound and Village Sites in Ohio," vol. 1, pt. 4.

*The Seip Mound is located three miles east of Bainbridge on Paint creek. See, "Certain Mounds and Village Sites in Ohio," vol. 2, pt. 1.

lay to the south about six inches higher than the remainder of the skeleton. With the exception of the skull and feet, all bones of the body were peculiarly and strikingly flattened, with indurated muscular tissue attached to them, giving a general impression of having been subjected to great pressure. The bones of the lower leg were stained with a small amount of red ochre, the only burial showing this condition.

Indications of the ceremony of the sacred fire were unmistakable in this instance, and the idea presents itself that the flattening of the bones may be the result of this proceeding, in part at least. It might be possible that at a certain stage of the ceremony, when heat had placed the skeletal parts in a favorable condition, that the heaping over them of the heavy earth covering would inaugurate such a change or flattening, the process being furthered by the weight of the incumbent earth and subsequent trampling above the burial. Again, the idea of a primary scaffold burial, presents itself as possibly explaining the preservation of the muscular tissue. Provided the season of the year and the atmospheric conditions were favorable, the muscular substance would become dry and hard, and thus be preserved; or the submitting of the body to the action of smoke while on the scaffold, as an intentional means of preserving the flesh, may not be unworthy of consideration. In either event, of course, secondary disposition of the body in the mound followed.

However, feeling the desirability of expert opinion in the matter, portions of the skeleton, together with parts of that from burial No. 7, found nearby and exhibiting a similar condition, were submitted for expert anatomical examination and report to Dr. T. Wingate Todd, of the Western Reserve University Medical School, Cleveland. The rarity of such conditions in skeletal remains in the Ohio mounds and the evident interest attaching thereto, seem to warrant full consideration of the subject. Dr. Todd's exhaustive report follows:

"The bones sent for examination prove to belong to two different skeletons, both of which have suffered considerable post-mortem deformation and are almost entirely mineralized. Of skeleton A there are a portion of the dorsal vertebral column,

Fig. 7. At work in the Mound.

the right clavicle and humerus, the upper seven right ribs, the right fibula, the left femur, patella, tibia and fibula. Of skeleton B there are only the right tibia and fibula. The tibia and fibula of skeleton A are still encrusted with a considerable amount of earth and crystalline material, which is present on the other limb bones in much less amount and indeed is absent from the bones of skeleton B. Portions of the scalene muscles remain attached to the first rib and remnants of the intercostals can be seen between the others. Vegetable fibres are still to be found embedded in the bones or incrustation together with ochre and wood ashes. All of these will be discussed in the appropriate place.

"In the consideration of such bones many questions present themselves. Were the bones crushed through external influence alone, or did some pathological condition of the skeletons themselves form the main or even an accessory factor in the deformation? May they be part of the skeletons of pregnant women which have undergone pathological softening during life? Are they merely the bones of senile or stout individuals which would resist less than usual the pressure of the soil above them? In what way has it come about that actual muscle has been preserved? Have there been attempts at post-mortem preservation? Of what nature are the vegetable fibres and how did thy come to be there? Are the ochreous and other stains on the bones evidence of mutilation before burial? Do the ashes signify cremation?

"Let us consider first the bones themselves and their deformation. Fig. 8 is a photograph of the bones of skeleton A. All except the vertebral column and the fragment showing clavicle and first rib are placed naturally with their distal extremities below. The portion of vertebral column however, is inverted, the narrower end being the uppermost, and the clavicle is so placed that its lateral extremity points upward and toward the right.

"The fragment of vertebral column consists of eight vertebrae from the dorsal series together with adjacent parts of several ribs. On careful examination of the reverse aspect portions of the spines can be seen embedded among charred

FIG. 8. Fragments of skeleton A., ventral surfaces. All the bones were more or less encrusted with earth and with charred muscular tissue. The fragments comprising vertebral column and clavicle are not in the natural position. All the others are. The deformation of the bones is clearly seen.

remnants of muscular tissue. The vertebrae are so crushed that on an average the ventral and dorsal surfaces are separated by only 6 mm. The dorsal aspect of the fragment is slightly concave and exhibits impressions indicating that the column has been flattened out upon some resistant material of irregular surface part of the superficial layer of which now adheres to the bones. There is no spondylitis. The bones can be identified with fair accuracy for the lowest has rib lying in contact with it, and in spite of the compression it can easily be recognized that the uppermost vertebral body is the smallest. It is unlikely then that this is higher than the fourth dorsal. Estimating on this basis, there are the 4th, to the 11th, dorsal vertebrae inclusive together with the heads of the 7th, 8th, 9th and 10th ribs on the left side and the 9th, 10th and 11th ribs on the right. If the higher vertebra be estimated as the fifth, we should have to allow that the lowest right rib is the twelfth and careful examination of the costal remnants forces me to reject this suggestion. All the bodies are cemented together into one piece and it is not always easy to identify the area corresponding to the intervertebral disc. The various dimensions are read at a glance from Fig. 9, from which also it is seen that the heads of the left ribs are embedded on the ventral surface of the vertebra while those of the right side are hidden behind the flattened out column. Thus the area of at least the lower vertebrae shown in the photograph corresponds rather to the left ventral aspect of the bones. In other words the compressing force has caught the spinal column obliquely and since the vertebrae would naturally fall on one or other side as the body settled down this oblique compression is easily understood. It is also evident that the settling of the body and the turning to the right of the vertebral column occurred while the costo-vertebral ligaments were still more or less intact.

"The fragment of right thorax like the last mentioned shows evidence upon its reverse face of an ash laden surface. In spite of the compression, enough of the curvature of the ribs has remained to make it certain that they are upper and not lower members of the series. The highest, moreover, is broader than the others and by comparison with its neighbor and with

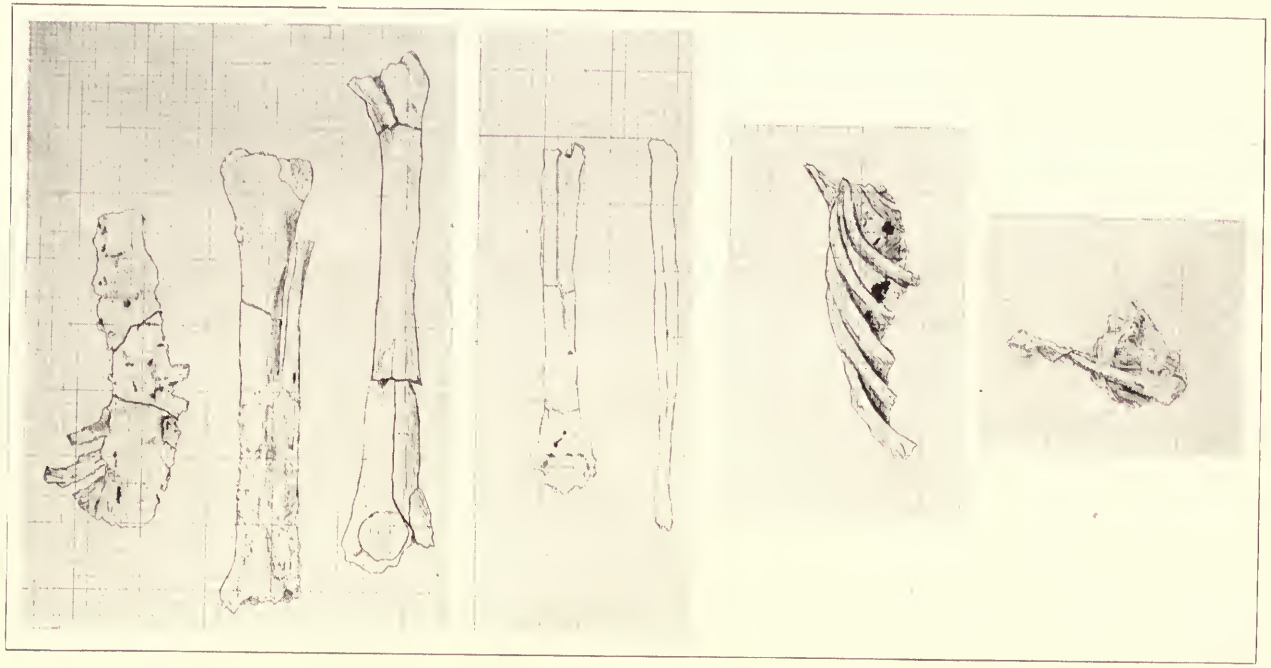

Fig. 9. Tracings on millimeter paper of the fragments of skeleton A. These drawings were made on Martin's Dioptrograph. All the bones are oriented to approximately the normal position.

the first rib which is definitely known, it is at once identified as the second. This fragment then which is like the rest apparently mineralized throughout* consists of the 2d, to the 7th ribs inclusive of the right side. The sketch of Fig. 9 shows perhaps more clearly than the photograph, the parts of the ribs preserved and their characters.

"The intercostal muscles are wonderfully distinct. Their fibres can be seen clearly under the microscope and display the 'resinous' appearance characteristic of muscles so preserved. The portion of the axillary border of the scapula united in this fragment needs no comment.

At once the question presents itself: What is the nature of the cementing substance and under what influence have portions of muscular tissue been preserved? But it is simpler to consider this matter after the actual physical character of the bones has been dealt with.

"The fragment including the calvicle and first rib of the right side shows also certain prominences which from their shape and position seem to be the ventral limbs of the transverse processes of the 5th and 6th cervical vertebrae. It is impossible to confirm this however, for on the reverse surface a root has grown and embedded itself in the material just where one would expect to find vestiges of the spines. Like the two last mentioned fragments this one presents a rough and somewhat conclave ash-laden dorsal surface. The clavicle is turned so that its ventral surface lies uppermost, the inner forward convexity arching over the first rib, the outer backward convexity lying lateral to the rib (see Fig. 9) and is so crushed as to approximate somewhat the ventral and dorsal aspects. The extremities are more crushed than the shaft and the sternal end is broken. The first rib remains almost intact but some artificial convexity has been produced by the bending downward of the extremities. The site of the sulous subolaviae is hidden by the clavicle and most of the area related to the subclavian vein is missing.

"Of the right humerus the upper extremity is missing and the lower is incomplete. The bone is compressed so that the

*Apparently only for on floating fragments on distilled water, oil globules separated out.

dorsal and ventral aspects are almost in contact, but the flattening is greatest at the extremities. The trochlear fossa is almost obliterated but the fossa oleorani and bicipital groove are still distinctly recognizable. Ashes and charred material encrust the dorsal aspect of this bone also on which can be seen many vertical fissures.

"The left femur and patella are in fair preservation though much broken up. When the fragments are placed in position, the appearance shown in Fig. 9, is presented. Thus only the head, neck and condylar surfaces are missing. The two ends of the bone have suffered greatly from crushing which has affected the femur practically in the sagittal direction. The compact tissue of ventral and dorsal aspects have been forced almost into contact though the shaft has suffered less compression than the two extremities. The normal forward convexity of the shaft is obliterated. The lateral and medial aspects of the upper two-thirds of the shaft from immediately beneath the lesser trochanter have been cracked. The patella is but slightly crushed. On the other hand it has made a considerable depression on the already much crushed lower extremity of the femur in which it is firmly embedded. There is less charred material on the dorsal aspect of the femur than on any other of the bones.

"The left tibia and fibula are still united by some brick-hard material round which is a good deal of earth. The former is almost complete, the latter bone lacks its upper and lower extremities. Both are heavily coated with a hard soil in which many quartz crystals can be seen. These bones, like the rest have suffered compression but the lower extremities are only slightly affected and the middle third of the fibula seems to have been protected from compression by the presence of the tibia of which the upper extremity and upper third have suffered severely. The bones must have rolled outward upon the settling of the body because the line of action of the compressing force passes through the tibia not in the sagittal direction but from before, backward and laterally. Both bones exhibit slight post-mortem bowing forward, the maximum convexity occurring about the junction of the middle and lower thirds of the tibia and at a somewhat

more distal point on the fibula. Much splintering and a certain small amount of charred material are seen on the dorsal aspect.

"The right fibula is cracked in its middle two-fourths. It is flattened only in its upper third which can be recognized as such in spite of the absence of both extremities, by the direction of the nutrient foramen and in a coronal direction, so that its medial and lateral surfaces are forced into contact (see Fig. 9.) No distortion has occurred in the length of the bone. It exhibits very little charred material.

"Since every bone shows compression in a very definite direction it can be stated with confidence that the body was lying in the grave upon its back. This is confirmed by the fact that the dorsal aspect alone shows evidence of the adherence of ashes. Once this position is admitted the varying amount of compression of the several bones is explicable. In all cases the shaft naturally shows less distortion than the extremities, but allowing for this, the greatest crushing occurred in the bones of the torso and arms (which would be placed by the sides.) The leg bones suffered less and indeed the lower ends of tibia and fibula are scarcely affected. Since the bones of the vertebral column have less compact tissue than those of the limbs it might be supposed that an equal weight distributed over the whole body would cause greater deformation of the vertebrae. That this was not the case in the body under consideration is shown by the fact that the humerus and clavicle suffered as greatly or nearly as greatly as the vertebral column. Earth must then have been heaped up more over the trunk than over the lower extrmities. It is now clear that the deformation was largely or entirely due to external factors.

No pathological condition of any part of the skeleton need be invoked as a predisposing cause. Had there been a local pathological cause, hemiplegia for instance, the deformation would have been distributed otherwise. It is true that such distortion might be predisposed to by an osteomalacic state, by senility or by excessive bodily stoutness. But the bones show no alteration in the relative thickness of their compact tissue to the size of the shaft. (Though this is scarcely measurable it is easily enough estimated by experience.) They do not

show that reduction of cancellous tissue found in the light fragile bones of the senile or the obese. In fact cancellous and compact tissue are well marked and the bones exhibit the texture of those of an individual in active middle age. No spondylitis, no lipping of articular margins are present to indicate old age or the wear of life, such as can be frequently found in Indian skeletons past the prime.

"If then, we abandon as causes for the distortion any pathological condition of the body itself, we must note what indications are present of external factors and to this we shall return later."

It has been observed that the skeleton as far as can be ascertained is that of an individual in the prime of life. Its sex is not so easily identified. From the appearance of muscular ridges on the long bones, from the relative size of measured or estimated articular ends when compared with the shafts, from the character of the ribs, experience would suggest this to be the skeleton of a woman. But knowing the great variations to be found in such bones as are here preserved, and especially since the sex of any skeleton may easily be belied by the appearance of its long bones, one hesitates to dogmatize. For the purpose of confirmation or otherwise of this "biological" reading of the sex, measurements have been made wherever possible of the bones of skeleton A and B and are to be compared with the corresponding measurements made upon a typical male and female Indian taken recently from a mound in Kelley's Island. It is to be noted that average measurements of a number of individuals have not been taken as standards. This perhaps requires a word of explanation. In individuals of both sexes there are not only considerable difference in mere dimensions of bones and variation in the actual type and this in the same race (Cf. Ales Hrdlicka; A study of the normal tibia. Am. Anthrop. 1898, vol. XX. p. 307). Therefore the average, whether it be of dimensions or indices and ratios, taken over a large number of bones reduces the study to a mathematical statement which may be far from representing the actual physical appearance of the bones investigated. For this reason typical adult specimens of both sexes were chosen (Figs. 12 and

13) and measurements made, which might be taken in themselves and their ratios as approximate sex standards. In comparing with these the measurements on skeleton A, it is necessary always to have before one the figures of the bones themselves so that when the signs + or — occur, one may estimate approximately how much should be added or substracted to give the real measurement, for through fragmentation and compression, the actual measurements are vitiated. At first sight this may and probably will seem a very unsatisfactory method, but it is the only one possible and if the tables are carefully compared side by side with the figures on the millimeter paper, it will be conceded I think, that one can come pretty close to the mathematical truth. In taking measurements direct, from the squared paper, it must be remembered that owing to torsion and deformation of the bones, the plane of the paper does not always correspond with the plane in which the calipers were held when the actual measurements were made. In taking all measurements the directions given in Martin's Lehrbuch der Anthropologie, Jan., 1914, were carefully followed as a standard of uniformity. The number and the title are therefore sufficient indication of the method of obtaining each measurement since they refer directly to those in Martin's Lehrbuch. In the case of the right fibula of skeleton B however, none of Martin's measurements were suitable. The two measurements a and b at the end of the table were made with the Gleitzirkel and these are the only ones taken which are not described by Martin.

Measurements.	♂ No. 3.		♀ No 4.			
Tibia.	R	L	R	L	A	B
1 General length.....	387	381+	361	349+	350	
1b. Length of Tibia..	376	376+	355	343	356—	
2a. Joint-face measurement ...	376	377	350	345	341	
3 Greatest proximal epighysis breadth	76	71+	67.5	67.5	71—	
6 Greatest distal epiphysis breadth	47.5	46+	44	38+	47—	40
7 Sagittal diameter of lower epiphysis..	33+	36.3	31	32	27+	31

Measurements.	♂ No. 3.		♀ No. 4.			
Patella.	R	L	R	L	A	B
1 Greatest height....	....	37	....	37	40.5	
2 Greatest breadth...	....	42.2	....	36	38.5	
Femur.						
2 Greatest trochanter length	445	446	423	422	400?	
6 Sagittal diameter at middle shaft.....	27.5	28.0	28.5	28.5	22+	
7 Transverse diameter at middle shaft..	26.2	23.5	24.0	24.0	27—	
8 Circumference of middle shaft.....	82.0	80.5	81.5	80	84?	
21 Epicondylar breadth	79	82	71	71	70+	
29 Angle between neck and shaft.....	132°	130°	119°	120°	126°?	
Humerus.						
4a. Greatest epicondylar breadth ...	61	60	53.5	53.0	50+	
5 Greatest thickness at middle	24	23.5	21.5	21.5	27—	
7a. Circumference at middle	69	66	?	67	58	
11 Breadth of trochlea	24	21	16	16	19—	
12 Breadth of Capitulum	19	?	19.5	19	16—	
14 Breadth of fossa oleorani	24	24.5	24.0	24.5	24.5	
Clavicle.						
1 Greatest length...	157.5	165.5	141	146	140.7	
4 Vertical thickness of middle	10	9	9.5	8.7	11.5	
5 Sagittal thickness of middle	14	12.5	11.2	9.5	8.5+	
6 Circumference of middle	39	36.5	34	29	33?—	
R. Fibula.....						
a. Greatest sagittal diameter of lower epiphysis	?	25.5	21.5	21.2	....	21.0
b. Greatest coronal diameter of lower epiphysis	?	18.0	18.0	16.2	....	14.0

"Another small fragment of skeleton A is present which possibly contains the head of one radius but this is by no means certain and hence the piece may be dismissed without further consideration. Making then the reservation which must always be made if the whole skeleton cannot be examined, it can be said that skeleton A is that of an adult woman in the prime of life and that no local or general pathological condition is to be noted on the bones themselves. There is no evidence to point to the cause of death.

"The right tibia and fibula, sole remnants of skeleton B indicate the body of a woman of middle age. They are badly crushed and fissured (see Figs. 10 and 11). The fibula is flat-

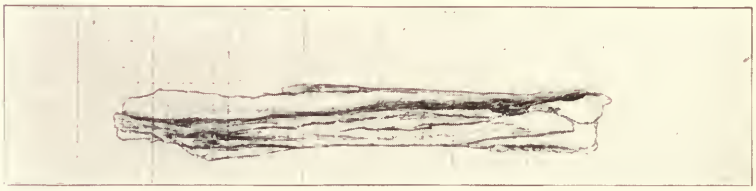

FIG. 10. Subcutaneous or medial aspect of the tibia of skeleton B. Beneath the articular surface can be seen the projecting lateral malleolus of the fibula. Note the considerable amount of fissuring of this aspect of the tibia.

tened out and firmly compressed against and now united with a similarly compressed tibia the dorsal and lateral surfaces of which have been flattened into one. The dorsal aspect is

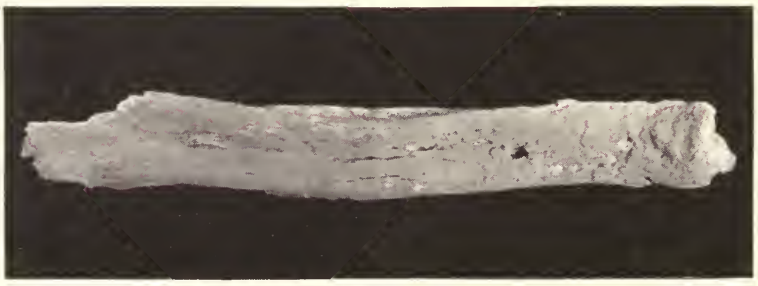

FIG. 11. Tracing on millimeter paper of the reverse side of the tibia and fibula of skeleton B. Note the great crushing and fissuring of the fibula now firmly embedded in the tibia.

actually concave through pressure upon underlying material and the fibula lies in contact with the lateral area. The medial (subcutaneous) surface has been flattened out very greatly and considerably fissured. The lower extremities of the two bones have suffered much less from compression than the shafts but show that the force was applied relative to the bones in a backward and outward direction. Actually the bones have rotated outward as the body collapsed and hence have been crushed in this manner.

"The next point to be considered is the post-mortem treatment of the bodies. I have already spoken of the evidence of charred wood encrusting the dorsal aspect of the bones. It is evident from the fact that the wood ashes occur only on this surface that the body was not buried in soil containing the remains of fires. It must either have been laid upon the hearth and covered over or cremated. There is no doubt that the latter is what happened.

"All the fragments, but more especially those comprising bones of the torso and arm, show distinctly vestiges of muscular tissue and indeed the intercostals and scalenes can be identified readily. The muscular tissue is charred in many places and still shows the fragmentation of the fibres produced by the great heat. Much muscular tissue and what must indicate the one time intervertebral discs are left, the former on the dorsal aspect of the vertebral column and thus the several vertebrae are firmly cemented together. The same is true of the ribs. Minute globules of oil can still be obtained from this tissue. Indeed it reminded me strongly of the condition seen in some of the graves of the pre-dynastic and early dynastic Egyptians in Nubia. In these shallow graves in the sand exposed to the intense heat and drying influence of the sun, much of the bodies has often been preserved without any effort upon man's part. A somewhat analogous action has occurred through fire in the present instance. Muscular tissue from the thoracic wall from the erector spinal of the back and from the elbow remains in considerable amount and in it the fibre bundles may still readily be seen. The other bones show only charred remains of muscle adherent to the dorsal aspect. Here and there among the muscle can be

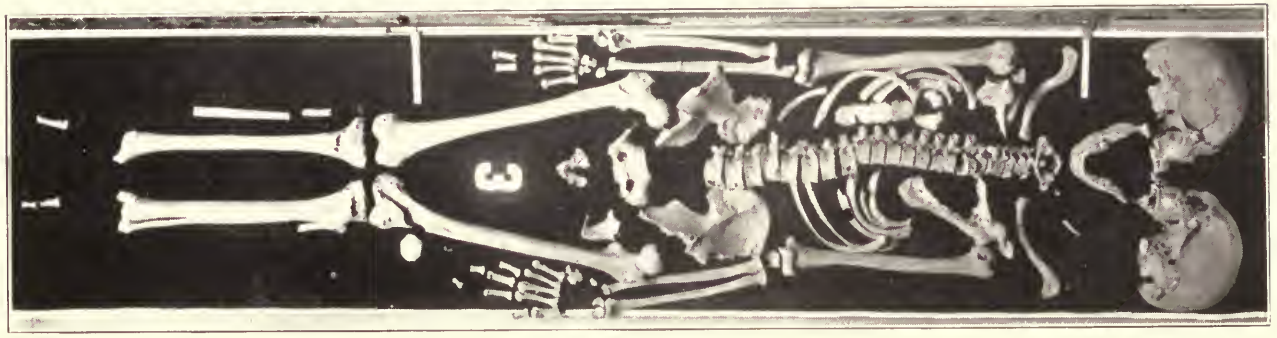

Fig. 12. Photograph of skeleton K. 3, for comparison with Figs. 8-11. This is a typical adult male skeleton from Kelley's Island and contrasts well with Fig. 9. The distance between the limbs of the stangenzirkel indicates one meter.

found small masses of carbonized material presenting the glistening black surface and finely striated texture of charred wood and again fine whitish grey wood ashes, invariably however on the under aspect of the body as it must have lain upon the pyre. The bones themselves show little evidence of charring, only the sternal end of the clavicle displays a fractured and burned surface. Everywhere the bones are mottled both externally and in the cancellous tissue with black stains. This is not actual charring. In some instances it may be altered blood pigment but in the majority of places it is undoubtedly due to chemical action of the soil; so-called humin stains.

"The tibia and fibula of skeleton B display these humin stains also and in addition on the lower quarter of the fibula is a distinct area where the bone has been scorched and blackened though not burned. The lower part of this bone also shows small rust colored patches suggestive but in the absence of injury scarcely diagnostic of blood.

"Upon all sides of the lower extremities of the tibia and fibula belonging to skeleton A are to be found minute masses of red ochre, which can be scraped off at once with a knife leaving a clean bone surface. This color is not to be found upon any other bones of skeleton A nor is it present upon the articular surface of the tibia or fibula. It is not to be seen on skeleton B. The idea of actual painting of the bones may be dismissed at once. Much clearer evidence for this than has been produced so far in literature must be obtained before one can concede such a habit of mutilation ever to have occurred among American aborigines. In the present instance the charred muscle upon the bones indicates that they were not stripped of flesh. Again ochre stains occur everywhere round the lower extremity of the tibia even on the areas to which the ligaments of the ankle joints are attached, but not upon the particular surface itself. It is not, however, so clear, whether the skin of the individual was painted with ochre before cremation or whether the color came from the wrappings. Many vegetable fibres occur in and among the bones but all of those which can be examined are more or less recent roots. Embedded between the bones of skeleton B, however, I found a number of masses of vegetable fibre which

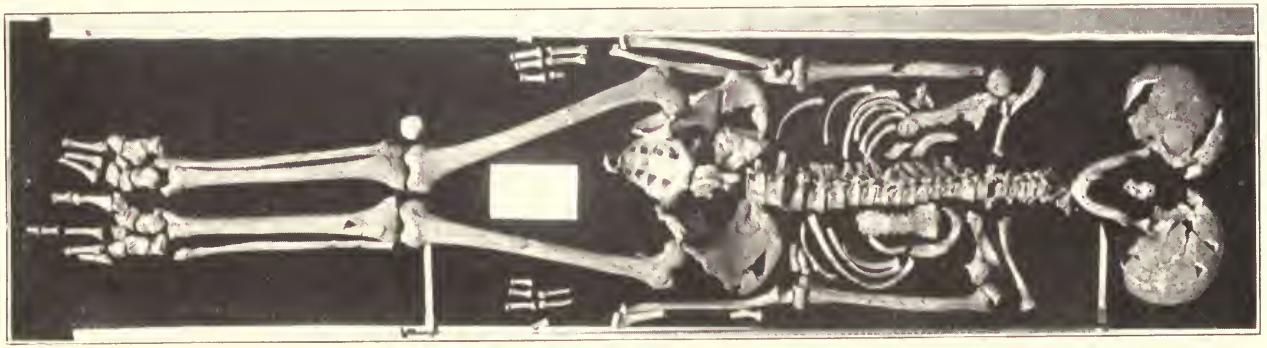

FIG. 13. Photograph of skeleton K. H, for comparison with Figs. 8-11. This is a typical adult female skeleton from Kelley's Island and contrasts well in sex characters with Fig. 8. The distance between the limbs of the stangenzirkel indicates one meter.

under the microscope proved to be roots the ends of some of which were brightly colored with the same ochre. Apparently they were accidentally stained by gathering small masses of ochre which had been sprinkled over the body before or after cremation took place.

We have seen then that the skeletons are those of adults, probably women, in the prime of life who died from some undiscovered cause and were incompletely cremated; that they were laid on their back on the pyre, that ochre was either sprinkled upon the bodies or used as a pigment for the mattings in which they were wrapped and that after cremation the bones were not disturbed. There is no evidence of attempts of preservation.

"We have still to consider the causes of the extreme deformation. It is certain from the ascertained relative positions of the bones that they were not disturbed after the burning. Soil was thrown upon them and settled down among them and that this was done very soon is shown by the lack of ash or charred wood among the soil encrusting the ventral aspects of the bones. The soil however is not baked in any way. The bones were not entirely mineralized by the cremation and lay partially embedded in a mass of charred wood and wood ashes, the alkaline reaction of which with the dampness of the soil would react upon the bones somewhat as it does in artificial maceration. It would make them softer than usual and more respondent to external pressure. The amount of this natural lye would obviously be greater under the body than under the legs and thus the bones of trunk and arm would be the more affected. In addition it would be natural to heap more soil over the center of the body and thus the pressure exercised by weight of earth would be greatest here. But the weight of soil may not have been and probably was not the greatest factor in bringing about the deformation of the bones. I do not yet know the precise position of the skeletons in the mound, but that is not, to my mind, very important.

"We know that mounds were built gradually, a bit at a time as necessary. It is likely then that the chief factor in

distorting the bones was not the amount of earth heaped upon them but the steady pressure exerted by this earth through constant pattering to and fro of Indian feet, upon a relatively small amount of earth, above the burial. The constant pounding and continuous pressure upon a skeleton rendered unnaturally soft and pliable as these undoubtedly were, is capable of enormous effect.

"It may be objected that little or no evidence has been produced to prove this assertion and that the result has been attained largely by a method of exclusion. This is to a certain extent true. Sufficient evidence has been obtained to show that the distortion was not brought about in any of the other ways known to be possible. Indeed all the evidence points to the external factor. It is, as I have said, recognized that mounds were built gradually and at irregular intervals, and it is conceded that the steady pressure and effect of well packed soil is very great. No better example need to be cited than that found at Shellal in Nubia by Professor Elliot Smith and Dr. Wood Jones. Over this archaic cemetery in which the bodies were buried in alluvial mud the main street of Shellal came to be situated. Scarcely a skull in this cemetery retained its proper shape. (Arch. Survey Nubia, Report for 1907-08. Vol. II, 1910, pp. 221-2.) The most likely cause of the hard packing of a relatively small amount of earth in an Indian mound is the constant passing and repassing of the people over it. In this way the pressure would start from the time of the burial and therefore would act when the bones owing to decomposition products and the alkalinity of the wood ashes were most impressionable."

Burial No. 7, was similar to No. 6 in that the skeleton was compressed and the muscular tissue preserved and attached to the bones. The burial was placed directly to the southeast of the preceding, and about one foot higher up. This skeleton is included in Dr. Todd's report, and his conclusions apply equally to the two.

Burial No. 8 was found within five feet of the top of the mound. It is shown as Fig. 14. This burial, together with all those remaining to be described with the exception of No. 9,

probably represent reburials. In this instance, the lower jaw, as well as the vertebrae, from the third cervical to the second lumbar, were missing, and evidently had been removed from their places before deposition in the mound, as the skeleton as uncovered showed no disarrangement. Had the vertebral column been intact, and only the lower jaw missing, there would be ground for believing that the individual had lost the jaw to an enemy, to be converted into a personal ornament or trophy. But under the circumstances it must be inferred that the body had received primary burial, either in a grave or on a scaffold, and that it was later interred in its last resting place. Such use of human bones is by no means uncommon, particularly as re-

FIG. 14. Shows burial in which the lower jaw and large portion of the vertebrae from the third cervicle to the second lumbar are missing.

gards the skull and jaws. A gorget made from a human skull was found in the western part of the mound, completely isolated from other objects or burial, where doubtless it had been lost during the construction of the work. This gorget, three and one-fourth inches in diameter, is shown in Fig. 15. Another specimen exactly similar, taken from a mound in Ross county, is in the Museum collection while both the upper and lower human jaws, made into ornaments or trophies, were taken from the Harness mound in Ross county.

Burial No. 9 was found four and one-half feet deep in a grave eight feet long, four and one-half feet in width and depth respectively. The skeleton is that of an adult male, about five feet and eleven inches in height. The massiveness of the bones indicate that the individual must have been a man of great

strength. The body was disposed at full length on a bed of prepared bark in the center of the floor of the grave, with the head to the south, and the hands beneath the hips. Near the right hip was found a cache of flint blades, fifteen in number, and with one exception (a stemmed or shouldered specimen) of the lanceolate, unnotched type. The specimens are about of

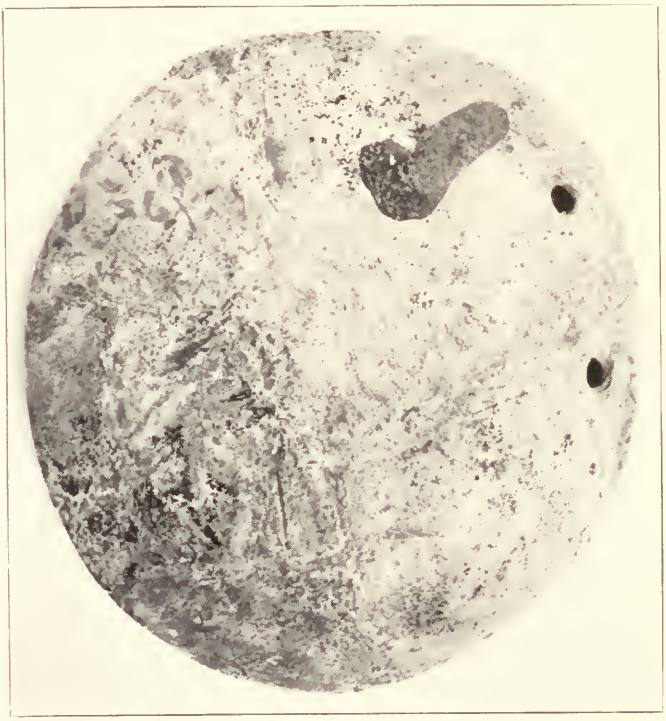

Fig. 15. Gorget made from human skull.

one size, averaging four and one-half inches in length, and are made from a mottled black flint, found in the coal measures of southern Ohio. Fig. 16 shows both types.

Near the lower right arm was found a spatula-like implement, made of a split metapodial bone of the elk, eleven and one-half inches long (Fig. 17); a peculiar whistle-like specimen of buff colored stone (Fig. 18); a chipping tool of bone, and a

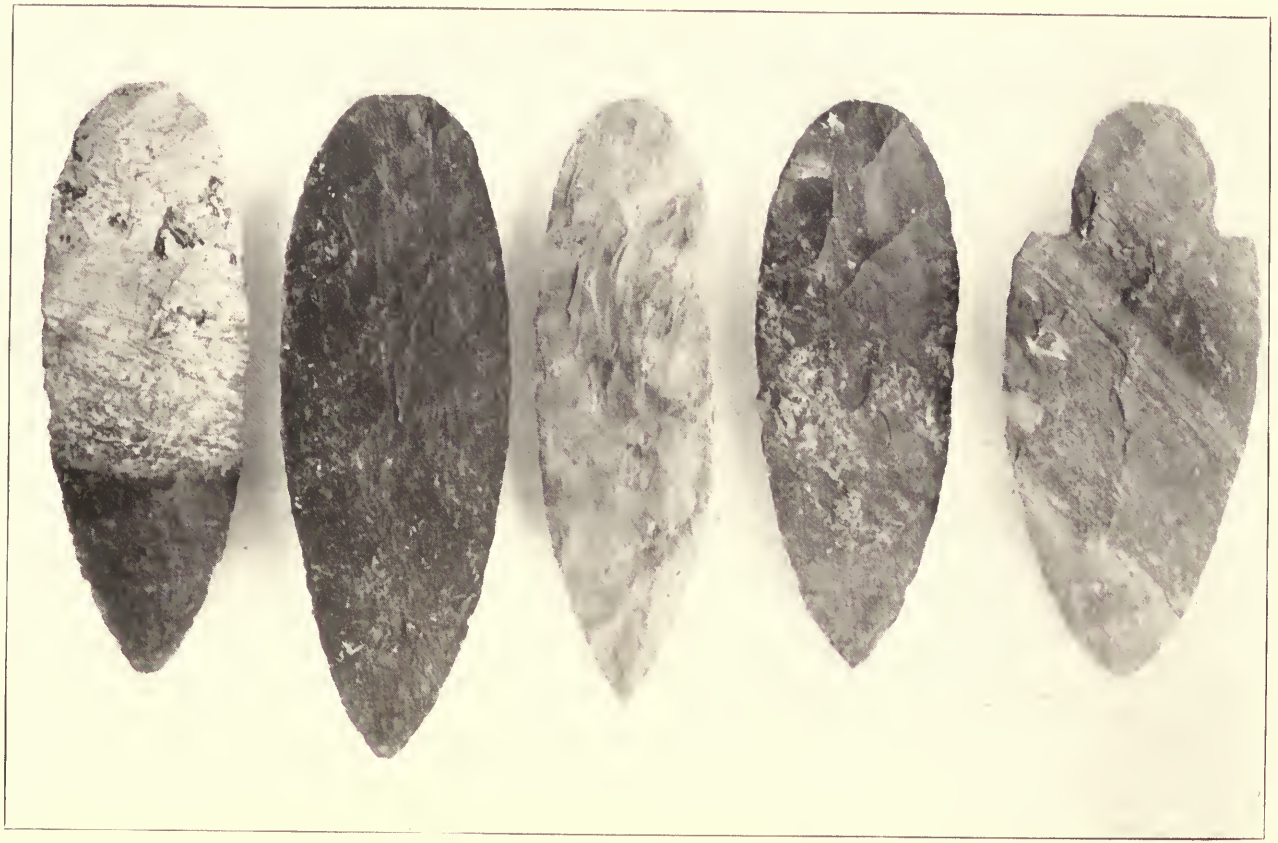

Fig. 16. Spear-points from large grave beneath the base near the center of the mound, known as burial No. 9.

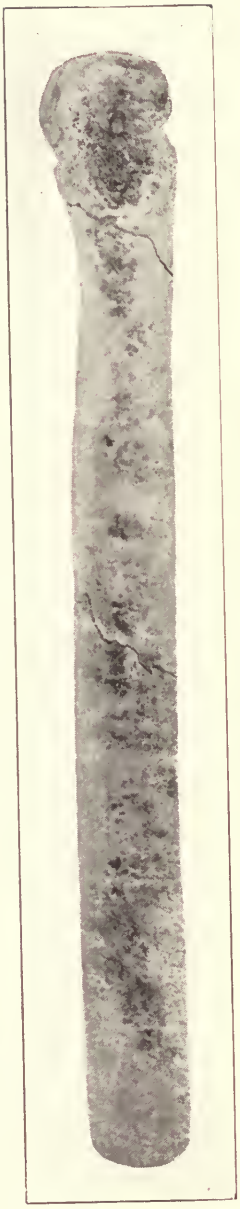

FIG. 17. Large spatula-like implement made of the metapodial bone of the elk, from burial No. 9.

discoidal stone (Fig. 20). A unique canoe-shaped gorget of yellowish limestone lay alongside the bones of the lower left arm. This specimen primarily is of the usual type, flat on the base, rounding on top and expanding at the center of each side, but in addition it has an extension from the top center, extend-

FIG. 18. Whistle-like specimen from burial No. 9.

FIG. 19. Opposite side of whistle-like specimen from burial No. 9.

ing from one to the other of the two usual perforations. This extension is less than one-half inch thick and one inch high, and is parallel with the longest axis of the gorget. A groove along its curved top evidently accommodated a cord passing from one perforation to the other. (Fig. 21.) This gorget is

the only one of its kind, so far as known, taken from an Ohio mound.

Perhaps the best illustration yet noted of the method of digging employed by the Ohio aborigines was shown in this grave. In the tough clay of its sides and ends, as fresh in appearance as if but recently done, were the clean-cut marks of the digging stick, where it had been driven into the earth with

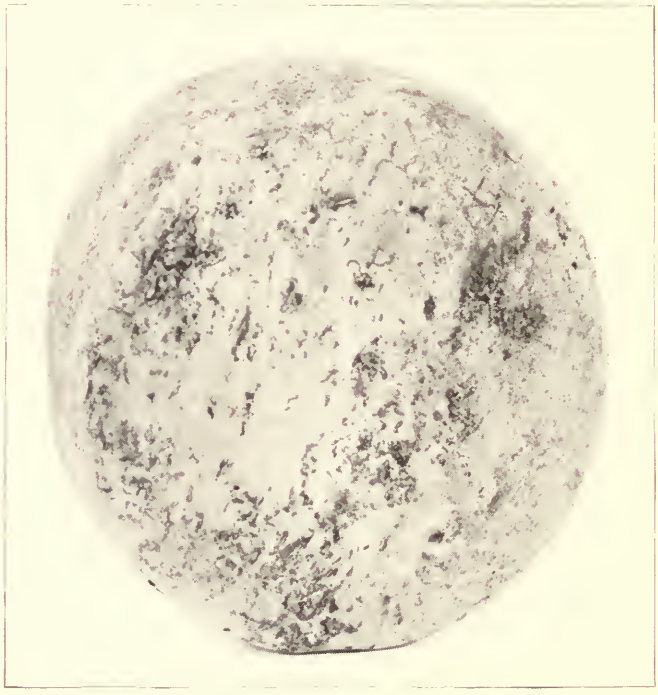

FIG. 20. Discoidal made of limestone from burial No. 9.

a stone hammer or maul, and then used as a lever for dislodging the chunks of clay. These marks, very bold and distinctive, were from one-half inch to one inch in diameter, extending vertically from the surface and showing the form of about one-half the thickness of the tool. They are shown in Fig. 22.

An interesting feature of this subterranean grave was that the body was furnished with unusual protection, in that the

FIG. 21. Canoe-shaped gorget made of limestone from burial No. 9.

FIG. 22. Shows the marks of the digging tool on the sides of the grave. Burial No. 9.

remains were placed in a sepulcher built of logs. The logs covering the top of the grave would serve to restrain the superincumbent earth doubtless for many years, or at least until the earth composing the mound above them had assumed a settled and compact form. Eventually however, the decay of the logs would permit the soil gradually to crumble into the grave, filling it with the loose earth, and leaving above it an arched cavity. The gradual slipping down of the loose earth, in this instance, was noticeable to a height of six or eight feet above the top of the grave. This condition is often noticeable in mounds containing subterranean burials, and is an infallible clue to their location. In this particular grave, the soil filling it was so loose that it was readily scooped out with a hand trowel, leaving the grave as fresh and clean-cut as if newly dug.

Burial No. 10 was placed five feet above the base line. It had been so disarranged by groundhog burrows that little could be learned of its original condition, many of the bones being missing and scattered.

Burial No. 11 was an adult male, placed two and one-half feet above the base of the mound. One arm and both feet were missing, indicating a re-burial. No implements or ornaments were placed in the grave, the same being true of all the secondary burials.

Burial No. 12, was that of an adult female, but only the skull and the arm and leg bones were present.

Burial No. 13, an adult male, was placed at the extreme southeast corner of the mound. Practically all the small bones were missing, and the larger bones present were badly decomposed.

Burial No. 14, placed in the southern section of the mound, four and one-half feet above the base line, was very incomplete. The head, one arm, and parts of both feet were missing. The grave had not been disturbed and doubtless represented a re-burial.

Burial No. 15, the last one found in the mound, was located at the southwest side, four feet above the base and but 18 inches below the surface. The skull and a few long bones only were found.

CONCLUSIONS.

The examination of the Westenhaver mound shows that it belongs to the early Hopewell culture, and in many ways resembles the Adena mound, located near Chillicothe. These mounds represent an interesting and distinct stage in the development of the Hopewell culture, to which they undoubtedly belong, as evidenced by the possession and use of copper, the skillful carving of stone, and other characteristics of the highest of the several cultures of Ohio aborigines. However, the use of copper, artistic stone carving and other marks of the typical Hopewell peoples are not so frequent as in the mounds representing the highest development of that culture, while on the other hand evidences and influences attributable to the lower cultures are more abundant. While the use of the sacred fire ceremony appears to have held a prominent place with these intermediary peoples, as well as with their more advanced prototypes, they appear not to have reached the plane where cremation of the dead was practiced.

With evidences of cultural advancement through any considerable period of time so obviously lacking, as regards the aboriginal inhabitants of the Ohio valley, it is perhaps gratifying to note that here, at least, in tracing the history of the Hopewell culture, we have at last something very definite. The evolution from a lower to a higher plane is exemplified in the Adena and Westenhaver stages, with such mounds as the Seip and Harness intermediate, and the Hopewell and Tremper mounds representing the highest development.

Future explorations doubtless will more clearly demonstrate this cultural development and furnish examples of still other stages in the process.

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